THE BARK OF A TREE "THE GREAT PROTECTOR AND RESOURCE."

By Mark A. Webber, Board-Certified Master Arborist

When you hear the word "bark" in reference to a tree you may know it as an area on the outside of tree trunk or covering tree branches. This important covering performs many important functions in woody plants. Bark formation is complex and is initiated by the process of cell division at the cambium, which produces xylem on the woody side (inside) and phloem, the primary bark tissue, on the exterior bark side. Phloem tissue contains phloem parenchyma, bast fibers, companion cells, and the very important sieve cells or sieve tubes. The main function of the sieve tube is transport of carbohydrates, primarily sucrose, in the plant

The layer of physiologically active tissue adjacent to the cambium is known as the inner bark and is relatively thin and light colored. As subsequent layers of phloem are laid down year by year, the outer layers become crushed and compressed, and the sieve elements and similar structures collapse. This tissue then ceases to take part in active physiological processes and is transformed into the relatively inert, dark outer bark that comprises the bulk of most tree barks. The rifted or scaly outermost layer of such bark on mature trees is then called the rhytidome. Thus is why tree bark can appear scaly or layered in appearance.

The structure of bark is further complicated by the presence of a second cambial layer within the bark called the phellogen or cork cambium. Periderm, or cork, is produced by this cork cambium and contributes appreciably to the structure of the outer bark. The innermost layer of periderm is normally considered as the boundary between the inner and outer bark. A number of other types of auxiliary tissues, (e.g. lignified sclerynchyma and medullary ray parenchyma), are also found in bark.

This brief description clearly demonstrates that bark of woody plants is a highly complex, heterogeneous material composed mainly of a thin, physiologically active inner layer and a complex, relatively inert outer layer. Barks principal functions is to protect the cambium and prevent loss of water. More so, the bark tissue that covers woody plants stems has many uses in human history and our future needs.

Silver Maple (Photo Source MkWebber2016

Barks many uses

The process of bark formation in itself produces many unique chemical compound, and unique fibers. Each species of woody plant in the world produces its own and unique by-products. Bark has a long history of utility ranging from the Indian's birch-bark canoes to the tapa cloth of the South Pacific. Cork, fiber, tannins, dyes, gums, resins, latex materials, foodstuffs, flavorings, fish and arrow poisons, antibiotics, and medicinals can all be derived from bark. Among some of the varied products obtained from bark are the flavoring, cinnamon; the antimalarial drug, quinine; the powerful aphrodisiac, yohimbine, used by natives and animal breeders; the cocktail ingredient, Angostura bitters, and the root beer flavoring, sassafras. Bark from trees can be used as a soil conditioner or mulch for landscape beds. Douglas-fir bark powder can be used alone as a thermosetting, water-resistant adhesive for plywood since it flows under heat and pressure.

The tremendous range of products obtainable from the bark is a reflection not only of the complexity of bark itself but also of the extreme differences between barks of different species. A most interesting utilization of bark is a source of chemical extracts with medicinal or physiological properties.

Our Future in Tree Bark

Research on the use of bark as a mulch and in particleboard and on the extraction of terpenes and polyphenols is currently being done. It is well known that deer sometimes browse on the bark of aspen trees when other food is not available in hard winters. Research is being carried on at the U.S. Forest Products Laboratory in cooperation with three land grant universities on the possibility of including certain barks in feeds for domesticated ruminate animals. Preliminary findings suggest that the inner bark of certain hardwoods should be readily digested by these animals. Experimental work has been done with the incorporation of Douglas-fir bark fiber into plastics as a reinforcement for molded products.

The bark of trees provides many vital functions to woody plants and its unique traits also provides many uses to humanity well after the tree has lost all of its biological function.

Silver Maple Bark magnified at 20X (Photo Source MkWebber2016

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